Listing of Claims:

1. (Original) A process for producing a dilute ethylene stream and a dilute propylene stream from a cracked gas stream, said process comprising the following steps in the order named:

(1) separating said cracked gas stream in a deethanizer zone to produce a C_2 – stream and a C_3+ stream;

(2). hydrogenating said C_2- stream in a hydrogenation zone to remove a portion of the acetylene to produce said dilute ethylene stream;

(3) separating said C_3+ stream in a depropanizer zone to produce a C_3 stream and a C_4+ stream; and

(4) reacting said C_3 stream in a MAPD reactor zone to convert a portion of methylacetylene and propadiene to propylene and propane to produce said dilute propylene stream.

2. (Original) A process according to claim 1 further comprising separating said C_4+ stream in a debutanizer zone to produce a C_4 stream and a C_5+ stream.

3. (Original) A process according to claim 1 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

4. (Original) A process according to claim 3 wherein said dilute ethylene derivative unit produces ethylbenzene.

5. (Original) A process according to claim 1 further comprising passing said dilute propylene stream to a dilute propylene derivative unit.

6. (Original) A process according to claim 5 wherein said dilute propylene derivative unit produces cumene, acrylic acid or propylene oxide.

7. (Original) A process according to claim 2 further comprising treating said C_5+ stream in a hydrotreating zone to produce a C_5 diolefins stream, a BTX stream, a DCPD stream and a fuel oil stream.

8. (Original) A process according to claim 1 wherein said cracked gas stream is produced by a process comprising:

(1) heating a hydrocarbon feed in a cracking zone to form a raw cracked gas stream; wherein said raw cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized, cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream; and

(5) drying said wet cracked gas stream in a drying zone to form a cracked gas stream.

9. (Original) A process according to claim 8 wherein said hydrocarbon feed is selected from the group consisting of ethane, propane, butanes, pentanes, naphtha, and mixtures thereof.

10. (Original) A process according to claim 8 wherein said hydrocarbon feed consists essentially of C_5 hydrocarbons.

11. (Original) A process for producing a dilute ethylene stream and a dilute propylene stream from a cracked gas stream, said process comprising the following steps in the order named:

(1) separating said cracked gas stream in a deethanizer zone to produce a C_2 – stream and a C_3+ stream;

(2) compressing said C_2- stream in a second compression zone to form a pressurized C_2- stream;

(3) hydrogenating said pressurized C_2- stream in a hydrogenation zone to remove a portion of the acetylene to produce said dilute ethylene stream;

(4) separating said C_3+ stream in a depropanizer zone to produce a C_3 stream and a C_4+ stream; and

(5) reacting said C_3 stream in a MAPD reactor zone to convert a portion of methylacetylene and propadiene to propylene and propane to produce said dilute propylene stream.

12. (Original) A process according to claim 11 further comprising separating said C_4+ stream in a debutanizer zone to produce a C_4 stream and a C_5+ stream.

13. (Original) A process according to claim 11 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

14. (Original) A process according to claim 13 wherein said dilute ethylene derivative unit produces ethylbenzene.

15. (Original) A process according to claim 11 further comprising passing said dilute propylene stream to a dilute propylene derivative unit.

16. (Original) A process according to claim 15 wherein said dilute propylene derivative unit produces cumene, acrylic acid, or propylene oxide.

17. (Original) A process according to claim 12 further comprising treating C_5+ stream in a hydrotreating zone to produce a C_5 diolefins stream, a BTX stream, a DCPD stream, and a fuel oil stream.

18. (Original) A process according to claim 11 wherein said cracked gas stream is produced by a process comprising:

(1) heating a hydrocarbon feed in a cracking zone to form a raw cracked gas stream; wherein said raw cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons, and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream; and

(5) drying said cracked gas stream in a drying zone to produce a cracked gas stream.

19. (Original) A process according to claim 18 wherein said hydrocarbon feed is selected from the group consisting of ethane, propane, butanes, pentanes, naphtha, and mixtures thereof.

20. (Original) A process according to claim 18 wherein said hydrocarbon feed consists essentially of C_5 hydrocarbons.

21. (Original) A process for producing a dilute ethylene stream and a dilute propylene stream from a cracked gas stream, said process comprising the following steps in the order named:

(1) hydrogenating a portion of the acetylene in said cracked gas stream in a hydrogenation zone to produce a reduced acetylene cracked gas stream;

(2) separating said reduced acetylene cracked gas stream in a deethanizer zone to produce said dilute ethylene stream and a C_3+ stream;

(3) separating said C_3+ stream in said depropanizer zone to produce a C_3 stream and a C_4+ stream; and

(4) reacting said C_3 stream in a MAPD reactor zone to convert a portion of methylacetylene and propadiene to propylene and propane to produce the dilute propylene stream.

22. (Original) A process according to claim 21 further comprising separating said C_4+ stream in a debutanizer zone to produce a C_4 stream and a C_5+ stream.

23. (Original) A process according to claim 21 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

24. (Original) A process according to claim 21 wherein said dilute ethylene derivative unit produces ethylbenzene.

25. (Original) A process according to claim 21 further comprising passing said dilute propylene stream to a dilute propylene derivative unit.

26. (Original) A process according to claim 25 wherein said dilute propylene derivative unit produces cumene, acrylic acid, or propylene oxide.

27. (Original) A process according to claim 22 further comprising treating C_5+ stream in a hydrotreating zone to produce a C5 diolefins stream, a BTX stream, a DCPD stream, and a fuel oil stream.

28. (Original) A process according to claim 21 wherein said cracked gas stream is produced by a process comprising:

(1) heating a hydrocarbon feed in a cracking zone to form a raw cracked gas stream; wherein said raw cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons, and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized, cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream; and

(5) drying said cracked stream in a drying zone to produce a cracked gas stream.

29. (Original) A process according to claim 28 wherein said hydrocarbon feed is selected from the group consisting of ethane, propane, butanes, pentanes, naphtha and mixtures thereof.

30. (Original) A process according to claim 28 wherein said hydrocarbon feed consists essentially of C_5 hydrocarbons.

31. (Previously presented) A process for producing a dilute ethylene stream and a dilute propylene stream, said process comprising the following steps in the order named:

(1) heating a hydrocarbon feed in a cracking zone to form a raw cracked gas stream; wherein said cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream;

(5) drying said wet cracked gas stream in a drying zone to produce a cracked gas stream;

(6) separating said cracked gas stream in a deethanizer zone to produce a C_2- stream and a C_3+ stream;

(7) compressing said C_2- stream in a second compression zone to form a pressurized C_2- stream;

(8) hydrogenating said pressurized C_2- stream in a hydrogenation zone to remove a portion of the acetylene to produce said dilute ethylene stream;

(9) separating said C_3+ stream in a depropanizer zone to produce a C_3 stream and a C_4+ stream; and

(10) reacting said C_3 stream in a MAPD reactor zone to convert a portion of methylacetylene and propadiene to propylene and propane to produce said dilute propylene stream.

32. (Original) A process according to claim 31 further comprising separating said C_4+ stream in a debutanizer zone to produce a C_4 stream and a C_5+ stream.

33. (Previously presented) A process according to claim 32 further comprising treating the C_5+ stream in a hydrotreating zone to produce a C_5 diolefins stream, a BTX stream, a DCPD stream, and a fuel oil stream.

34. (Original) A process according to Claim 31 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

35. (Original) A process according to claim 34 wherein said dilute ethylene derivative unit produces ethylbenzene.

36. (Original) A process according to claim 31 further comprising passing said dilute propylene stream to a dilute propylene derivative unit.

37. (Original) A process according to claim 36 wherein said dilute propylene derivative unit produces cumene, acrylic acid or propylene oxide.

38. (Original) A process according to claim 31 wherein said hydrocarbon feed is selected from the group consisting of ethane, propane, butanes, pentanes, naphtha and mixtures thereof.

39. (Original) A process according to claim 31 wherein said hydrocarbon feed consists essentially of C_5 hydrocarbons.

40. (Previously presented) A process for producing a dilute ethylene stream and a dilute propylene stream, said process comprising the following steps in the order named:

(1) heating a hydrocarbon feed in a cracking zone to form a cracked gas stream; wherein said cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons, and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream;

(5) drying said wet cracked gas stream in a drying zone to produce a cracked gas stream;

(6) separating said cracked gas stream in a deethanizer zone to produce a C_2- stream and a C_3+ stream;

(7) hydrogenating said pressurized, C_2- stream in said hydrogenation zone to remove a portion of the acetylene to produce said dilute ethylene stream;

(8) separating said C_3+ stream in a depropanizer zone to produce a C_3 stream and a C_4+ stream; and

(9) reacting said C_3 stream in a MAPD zone to convert a portion of methylacetylene and propadiene to propylene and propane to produce said dilute propylene stream.

41. (Original) A process according to claim 40 further comprising separating said C_4+ stream in a debutanizer zone to produce a C_4 stream and a C_5+ stream.

42. (Original) A process according to claim 40 further comprising treating C_5+ stream in a hydrotreating zone to produce a C_5 diolefins stream, a BTX stream, a DCPD stream, and a fuel oil stream.

43. (Original) A process according to Claim 40 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

44. (Original) A process according to Claim 43 wherein said dilute ethylene derivative unit produces ethylbenzene.

45. (Original) A process according to Claim 40 further comprising passing said dilute propylene stream to a dilute propylene derivative unit.

46. (Original) A process according to Claim 45 wherein said dilute propylene derivative unit produces cumene, acrylic acid, or propylene oxide.

47. (Original) A process according to claim 40 wherein said hydrocarbon feed is selected from the group consisting of ethane, propane, ethane-propane mix, butanes, pentanes and naphtha and mixtures thereof.

48. (Original) A process according to claim 40 wherein said hydrocarbon feed consists essentially of C_5 hydrocarbons.

49. (Previously presented) A process for producing a dilute ethylene stream and a dilute propylene stream from a cracked gas stream, said process comprising the following steps in the order named:

(1) heating a hydrocarbon feed in a cracking zone to form a raw cracked gas stream; wherein said raw cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons, and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream;

(5) drying said cracked gas stream in a drying zone to produce a cracked gas stream;

(6) hydrogenating a portion of the acetylene in said cracked gas stream in a hydrogenation zone to produce a reduced acetylene cracked gas stream;

(7) separating said reduced acetylene cracked gas stream in a deethanizer zone to produce said dilute ethylene stream and a C_3+ stream;

(8) separating said C_3+ stream in said depropanizer zone to produce a C_3 stream and a C_4+ stream; and

(9) reacting said C_3 stream in a MAPD reactor zone to convert a portion of methylacetylene and propadiene to propylene and propane to produce said dilute propylene stream.

50. (Original) A process according to claim 49 further comprising separating said C_4+ stream in a debutanizer zone to produce a C_4 stream and a C_5+ stream.

51. (Original) A process according to claim 49 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

52. (Original) A process according to claim 51 wherein said dilute ethylene derivative unit produces ethylbenzene.

53. (Original) A process according to claim 49 further comprising passing said dilute propylene stream to a dilute propylene derivative unit.

54. (Original) A process according to claim 53 wherein said dilute propylene derivative unit produces cumene, propylene oxide, or acrylic acid.

55. (Previously presented) A process according to claim 50 further comprising treating C_5+ stream in a hydrotreating zone to produce a C_5 diolefins stream, a BTX stream, a DCPD stream, and a fuel oil stream.

56. (Original) A process according to claim 49 wherein said hydrocarbon feed is selected from the group consisting of ethane, propane, butanes, pentanes, naphtha and mixtures thereof.

57. (Original) A process according to claim 49 wherein said hydrocarbon feed consists essentially of C_5 hydrocarbons.

58. (Previously presented) A process for producing a dilute ethylene stream from a cracked gas stream, said process comprising the following steps in the order named:

(1) separating said cracked gas stream in a deethanizer zone to produce a C_2 – stream and a C_3+ stream;

(2) hydrogenating said C_2- stream in a hydrogenation zone to remove a portion of the acetylene to produce said dilute ethylene stream; and

(3) routing said C_3+ stream to storage or other process unit.

59. (Original) A process according to claim 58 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

60 (Original) A process according to claim 59 wherein said dilute ethylene derivative unit produces ethylbenzene.

61. (Original) A process for producing a dilute ethylene stream from a cracked gas stream, said process comprising the following steps in the order named:

(1) separating said cracked gas stream in a deethanizer zone to produce a C_2 – stream and a C_3+ stream;

(2) compressing said C_2- stream in a second compression zone to form a pressurized C_2- stream;

(3) hydrogenating said pressurized C_2- stream in a hydrogenation zone to remove a portion of the acetylene to produce said dilute ethylene stream; and

(4) routing said C_3+ stream to storage or other process unit.

62. (Original) A process according to claim 61 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

63. (Original) A process according to claim 62 wherein said dilute ethylene derivative unit produces ethylbenzene.

64. (Previously presented) A process for producing a dilute ethylene stream from a cracked gas stream, said process comprising the following steps in the order named:

(1) hydrogenating a portion of the acetylene in said cracked gas stream in a hydrogenation zone to produce a reduced acetylene cracked gas stream;

(2) separating said reduced acetylene cracked gas stream in a deethanizer zone to produce said dilute ethylene stream and a C_3+ stream; and

(3) routing said C_3+ stream to storage or other process unit.

65. (Original) A process according to claim 64 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

66. (Original) A process according to claim 65 wherein said dilute ethylene derivative unit produces ethylbenzene.

67. (Previously presented) A process for producing a dilute ethylene stream said process comprising the following steps in the order named:

(1) heating a hydrocarbon feed in a cracking zone to form a raw cracked gas stream; wherein said cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream;

(5) drying said wet cracked gas stream in a drying zone to produce a cracked gas stream;

(6) separating said cracked gas stream in a deethanizer zone to produce a C_2- stream and a C_3+ stream;

(7) compressing said C_2- stream in a second compression zone to form a pressurized C_2- stream;

(8) hydrogenating said pressurized C_2- stream in a hydrogenation zone to remove a portion of the acetylene to produce said dilute ethylene stream; and

(9) routing said C_3+ stream to storage or other process unit.

68. (Original) A process according to claim 67 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

69. (Original) A process according to claim 68 wherein said dilute ethylene derivative unit produces ethylbenzene.

70. (Original) A process for producing a dilute ethylene stream, said process comprising the following steps in the order named:

(1) heating a hydrocarbon feed in a cracking zone to form a cracked gas stream; wherein said cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons, and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream;

(5) drying said wet cracked gas stream in a drying zone to produce a cracked gas stream;

(6) separating said cracked gas stream in a deethanizer zone to produce a C_2- stream and a C_3+ stream;

(7) hydrogenating said pressurized, C_2- stream in said hydrogenation zone to remove a portion of the acetylene to produce said dilute ethylene stream; and

(8) routing said C_3+ stream to storage or other process unit.

71. (Original) A process according to claim 70 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

72. (Original) A process according to claim 70 wherein said dilute ethylene derivative unit produces ethylbenzene.

73. (Previously presented) A process for producing a dilute ethylene stream, said process comprising the following steps in the order named:

(1) heating a hydrocarbon feed in a cracking zone to form a raw cracked gas stream; wherein said raw cracked gas stream comprises hydrogen, methane, C_2 hydrocarbons, C_3 hydrocarbons, and heavier constituents;

(2) quenching said raw cracked gas stream in a quenching zone to produce a quenched, cracked gas stream;

(3) compressing said quenched, cracked gas stream in a first compression zone to form a pressurized cracked gas stream;

(4) deacidifying said pressurized, cracked gas stream in a deacidifying zone to remove a portion of the hydrogen sulfide to form a wet cracked gas stream;

(5) drying said cracked gas stream in a drying zone to produce a cracked gas stream;

(6) hydrogenating a portion of the acetylene in said cracked gas stream in a hydrogenation zone to produce a reduced acetylene cracked gas stream;

(7) separating said reduced acetylene cracked gas stream in a deethanizer zone to produce said dilute ethylene stream and a C_3+ stream; and

(8) routing said C_3+ stream to storage or other process unit.

74. (Original) A process according to claim 73 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

75. (Original) A process according to claim 73 wherein said dilute ethylene derivative unit produces ethylbenzene.

76. (Original) A process for producing a dilute ethylene stream and a dilute propylene stream, said process comprising the following steps in the order named:

(1) separating a cracked gas stream in a depropanizer zone to form a C_3- stream and a C_4+ stream;

(2) separating said C_3- stream in a deethanizer zone to form a C_2- stream and a C_3 stream;

(3) hydrogenating a portion of the acetylene in said C_2- stream in a hydrogenation zone to produce a dilute ethylene stream; and

(4) reacting said C_3 stream in a MAPD zone to convert a portion of methylacetylene and propadiene to propylene and propane to produce said dilute propylene stream.

77. (Original) A process according to claim 76 further comprising separating said C_4+ stream in a debutanizer zone to produce a C_4 stream and a C_5+ stream.

78. (Original) A process according to claim 76 further comprising passing said dilute ethylene stream to a dilute ethylene derivative unit.

79. (Original) A process according to claim 78 wherein said dilute ethylene derivative unit produces ethylbenzene.

80. (Original) A process according to claim 76 further comprising passing said dilute propylene stream to a dilute propylene derivative unit.

81. (Original) A process according to claim 80 wherein said dilute propylene derivative unit produces cumene, acrylic acid or propylene oxide.

82. (Original) A process according to claim 77 further comprising treating said C_5+ stream in a hydrotreating zone to produce a C_5 diolefins stream, a BTX stream, a DCPD stream and a fuel oil stream.

83. (Previously presented) A process according to claims 1, 11, 21, 31, 40, 49, 58, 61, 64, 67, 70, 73, or 76 wherein a propylene oxide stream is produced by a process comprising the following steps:

(1) reacting said dilute ethylene with benzene in an ethylbenzene reactor zone to form and ethylbenzene stream;

(2) oxidizing said ethylbenzene stream with air in an EB oxidation zone to form a EBHP stream;

(3) reacting said EBHP stream with a dilute propylene stream in a propylene epoxidation zone to form an impure propylene oxide stream;

(4) separating said impure propylene oxide stream in a product separator zone to form a raw propylene oxide stream, a MBA/ACP stream, a tail gas stream, and a residue stream;

(5) separating said raw propylene oxide stream in a propylene oxide separations zone to form an impurities stream and said propylene oxide stream; and

(6) reacting said MBA/ACP stream in a styrene production and separation zone to form a styrene stream, a fuel stream, and a wastewater stream.

84. (Original) A process according to claims 1, 11, 21, 31, 40, 49, or 76 wherein an acrylic acid stream is produced by a process comprising the following steps:

(1) oxidizing said dilute propylene stream in a oxidation reactor zone to form a aqueous acrylic acid stream and a vent gas stream; and

(2) seperating said aqueous acrylic acid stream in a recovery and purification zone to form said acrylic acid stream and a mixed acid/ester waste stream.

85. (Previously presented) A process according to claims 1, 11, 21, 31, 40, 49, or 76 wherein a cumene stream is produced by a process comprising the following steps:

(1) reacting a dilute propylene stream and a benzene feed stream in a dilute propylene alkylation zone to produce a raw cumene stream;

(2) separating said raw cumene stream in a cumene separations zone to form a benzene stream, a heavies stream, said cumene stream, a dipropyl benzene stream, and a propane stream.

(3) transalkylating said benzene stream and dipropyl benzene stream in a transalkylation zone to form a transalkylated cumene rich stream;

(4) separating said transalkylated cumene-rich stream in said cumene separations zone to produce said cumene stream, said propane stream, said heavies stream and said benzene stream; and

(5) optionally, recycling a portion of said benzene stream to said dilute propylene alkylation zone.

86. (Previously presented) A process according to claims 1, 11, 21, 31, 40, 49, 58, 61, 64, 67, 70, 73, or 76 wherein a ethylbenzene stream is produced by a process comprising the following steps:

(1) reacting a dilute ethylene stream and a benzene stream in an alkylation reactor zone to form an ethylbenzene rich stream;

(2) separating said ethylbenzene rich stream in a ethylbenzene separation zone to form a separations benzene recycle stream, a separations tail gas stream, a diethylbenzene and polyethylbenzene stream, and a ethylbenzene stream;

(3) reacting said separations benzene recycle stream in an ethylbenzene transalkylation reactor zone to produce said ethylbenzene rich stream; and

(4) optionally, recycling a portion of said separations benzene recycle stream to said dilute propylene alkylation reactor zone.